

Low Carbon Fuel Standard Workshop: Proposed Economic Analysis

December 2, 2008



Proposed Scoping Plan (PSP)

- PSP assumptions
 - Alternative fuels produced at less cost than petroleum-based fuels
 - Cost differential will recover capital for alternative fuel production
 - Consumer will not be impacted
- Economic analysis will examine and expand upon PSP estimates



Baseline Determination

- “Business as usual” (BAU) case
- Regulations and programs in place
 - Federal Renewable Fuel Standard (RFS)
 - ARB Zero Emission Vehicle (ZEV) regulation
 - Corporate Average Fuel Economy (CAFE) program
 - Pavley Regulation
- Staff will consider all years between 2010 -2020

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Federal Renewable Fuel Standard

- Energy Policy Act of 2005 (RFS1)
- Energy Independence and Security Act of 2007 (RFS2)
 - 36 billion gallons of renewable fuels by 2022
 - 21 billion gallons must be “advanced biofuels”
 - Set CAFE standard of 35 mpg by 2020
- Low-carbon-intensity fuels will be in the marketplace
- California will have some of these low-CI fuels

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Baseline Determination

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ARB ZEV Program

- Battery electric vehicles (BEVs)
- Plug-in hybrid vehicles (PHEVs)
- Fuel cell vehicles (FCVs)
- Estimated 560,000 on the road by 2020
- Staff considering this as part of the baseline

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Baseline Determination

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Pavley Regulation

- Adopted in 2005
- Reduces GHG emissions from light-duty vehicles beginning in 2009
- Anticipate federal approval
- Consider benefits as part of the baseline
- ARB committed to further reductions (Pavley II)

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Baseline Determination

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Petroleum and Fuel Prices

- Crude
 - \$50 - \$140/bbl in 2008
 - Proposed Scoping Plan: \$89/bbl
- Gasoline (State Alternative Fuels Plan)
 - 2010: \$2.72 - \$3.47/gal
 - 2020: \$2.94 - \$4.41/gal
- Diesel (State Alternative Fuels Plan)
 - 2010: \$2.43 - \$3.10/gal
 - 2020: \$2.59 - \$3.88/gal
- Staff working with CEC on estimates

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Baseline Determination

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LCFS Costs

- Capital costs
 - Construct facilities that provide alternative fuels
 - Five percent discount rate for 10 years(?)
- Operating costs
 - Feedstock
 - Utilities
 - Labor
 - Maintenance
 - Storage
 - Transportation
 - Dispensing

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LCFS Savings

Less petroleum-based fuel purchased

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LCFS Net Cost

- Petroleum-based fuel savings subtracted from capital and operating costs
- Staff expects an overall “net” savings
- This “net” to be used for capital recovery of alternative-fuel production facilities
- No impact on consumers

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Specific Scenario Analyses

- Staff developed seven illustrative examples of compliance paths (four gasoline, three diesel)
 - Gasoline scenarios include varying amounts of ethanol (all sources) and ZEV deployment
 - Diesel scenarios include low-CI biodiesels, CNG penetration, and additional advanced-technology vehicles
- Staff proposes to conduct economic analysis for these scenarios
- Staff solicits discussion on broader analyses

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Alternative Fuel Costs

- Staff relying on several studies
 - “Strategic Assessment of Bioenergy Development in the West” (Antares Group for Western Governors Association)
 - Department of Energy
 - National Research Council
- Staff continues to refine values
- Staff seeks recommendations on alternative sources of information

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Example Alternative Fuel Costs

FUEL	FEEDSTOCK	TOTAL COST	REFERENCE
Ethanol	Corn (wet/dry)	\$1.88/\$1.84	Antares
Ethanol	Cellulosic	\$1.43	Antares
Biodiesel	Soybean oil	\$3.13	Antares
Biodiesel	Yellow grease	\$3.24	Antares
Biodiesel	Algal oil	\$2.83	Huntley and Redalje
F-T Diesel	Poplar	\$3.24	Antares
FAHC Diesel	Virgin oil	\$3.14	Antares
CNG	Natural gas	\$1.78 GGE	CEC
Electricity	CA marginal	\$2.67 GGE	Energy and Economics, Inc.
Hydrogen	Multiple	\$2.60 - \$10.00 GGE	DOE and Natural Research Council

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Vehicle and Infrastructure Costs

- Staff assumes current and potentially enhanced ZEV regulation will provide significant number of vehicles
- Therefore, no incremental vehicle costs for LCFS
- Infrastructure taken into account with alternative fuel costs
- Staff will “deconstruct” alternative fuel costs into capital and operating costs

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Other Regulation Costs

- Enforcement
 - Electricity metering
 - Recordkeeping and reporting
- Impact on businesses
 - Typical business
 - Small business
 - Competitiveness
- Impact on government
 - Federal
 - State
 - Local

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Socioeconomic Analysis

- Staff will investigate and identify potential socioeconomic issues of LCFS
- Staff considering using E-DRAM for this purpose
- Staff solicits input on the appropriateness of this application and suggestions for alternative approaches

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